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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/111,454	07/08/1998	ARIEL BEN-PORATH	49959-013	5838

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APPLIED MATERIALS, INC.
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EXAMINER	
BALI, VIKKRAM	

ART UNIT	PAPER NUMBER
2623	29

DATE MAILED: 12/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/111,454	Applicant(s) BEN-PORATH ET AL	
	Examiner Vikkram Bali	Art Unit 2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,6-8,18-20,23-25,35-38,40-48 and 61-63* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6-8,18-20,23-25,35-38,40-48 and 61-63* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. In view of the appeal brief filed on 9/26/2003, PROSECUTION IS HEREBY REOPENED. A new grounds of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-3, 6-8, 18-20, 23-25, 37-38, 40-42 and 61-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuno (US 6047083) in view of Broude et al (US 5814829) and in further view of Shimizu (US 4849901).

With respect to claim 1, Mizuno discloses method and system for manufacturing semiconductor devices and method and system for inspecting semiconductor devices comprising "imaging the surface" (see figure 1, detector for the taking the image of the article); and "classifying each of the defects as being in one of a predetermined number of invariant core classes of defects", (see figure 7, and col. 3, line 56-59 and lines 38-41, the invariant core classes are the short circuit, line breakage etc) as claimed. However, he fails to disclose: "determining a total number of defects in each of the core classes"; and "generating an alarm signal when the total number of defects in a specific one of the core classes is equal to or greater than a first predetermined number", as claimed. Broude in a system for inspection teaches "determining a total number of defects in each of the core classes"; and "generating a signal when the total number of defects in a specific one of the core classes is equal to or greater than a first predetermined number", (see Abstract, lines 2-12, wherein the flaws are detected and counted and the compared to an threshold and if the counter exceeds the threshold a signal is generated) as claimed.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Mizuno's method and system for manufacturing semiconductor devices and method and system for inspecting semiconductor devices by introducing a counter for counting the defects, comparing the counter to a threshold, and if the threshold exceeds a limit generating a signal as taught by Broude in his inspection system. This modification will provide an inspection system for an article that will detect the defects and classify the defects in the different classes and will have a counter for counting the defects, comparing the counter to a threshold, and if the threshold exceeds a limit generating a signal to stop the process in order to get a better yield.

Mizuno and Broude discloses the invention substantially as disclosed and described above. However they fail to disclose "generating a alarm" as claimed. Shimizu in substrate inspection for flatness and alarm teaches "generating a alarm", (see col. 8, lines 61-64, it states that a alarm ALM-2 [notifying an operator] is generated if the number of chips having a flaw i.e. poor flatness exceeds a predetermined number and eventually the system is stopped) as claimed.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Mizuno's and Broude's method and system for manufacturing semiconductor devices and method and system for inspecting semiconductor devices by introducing an alarm if the flaw exceeds a predetermined number on a wafer (see col. 8, lines 61-64) as taught by Shimizu, as all the references are analogous because they are solving similar problem of inspection. The motivation of combining the alarm in to the system is straight forward as in any system tat is time and money based to make sure if any fault in the inspection of the article go more than

a threshold then the system provides an alarm to an operator to interface in the system in order to rectify the problem in order to better yield.

With respect to claim 2, Mizuno further discloses "core classes of defects comprise a missing pattern on the surface, an extra pattern on the surface, a particle on the surface, a particle embedded in the surface, and micro scratches on the surface", (see figure 7 for classification of the defects into the core classes and the col. 3, lines 37-45) as claimed.

With respect to claim 3, Mizuno discloses the "SEM" (see col. 3, lines 57-59) as claimed.

With respect to claim 6, Mizuno further discloses "classifying the defect as being in one of an arbitrary number of variant subclasses", (see col. 3, lines 43-44, the size of the defects) as claimed.

Claims 7-8 and 24-25 are rejected as claim 1, because claims 7-8 and 24-25 are claiming similar subject matter as claim 1.

Claims 18, 19 and 23 are rejected as claims 1, 2 and 6, because claims 18, 19 and 23 are claiming similar subject matter as claims 1, 2 and 6.

Claim 20 are rejected as claim 3, because claim 20 is claiming similar subject matter as claim 3.

With respect to claim 37, Takagi Broude and Shimizu discloses the invention as described for claim 1. For claim 37 Mizuno further discloses "an image to produce an image of the defect and a reference image; storage device to store the defect image and the reference image; a comparator to compare the defect image and the reference image; and processor to classify the defect as being in one of a predetermined number of invariant core classes of defects", (see col.4, lines 30-41) as claimed.

Claim 38 are rejected as claim 3, because claim 38 is claiming similar subject matter as claim 3.

With respect to claim 40, it is well known to use the digital storing device, therefore, it would have been obvious to one ordinary skilled in the art at the time of invention to use the digital storing device because it is well known in the art and is readily available in the market for the data storage,

Claim 41 are rejected as claim 6, because claim 41 is claiming similar subject matter as claim 6.

Claim 42 are rejected as claims 7 and 8, because claim 42 is claiming similar subject matter as claims 7 and 8.

Claims 61-63 are rejected as claims 1, 18 and 37, because claims 61-63 are claiming similar subject matter as claims 1, 18 and 37.

5. Claims 35-36 and 43-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuno (US 6047083) in view of Broude et al (US 5814829) and in further view of Shimizu (US 4849901) as applied to claim 18 above, and further in view of Shahar et al (US 5591971).

With respect to claims 43-45, Mizuno, Broude and Shimizu discloses the invention substantially as disclose and as described above in claim 38. However, they fails to disclose "a plurality of spaced-apart detectors and a monitor to display images produced by the plurality of detectors"; "SEM comprises an SEM column, wherein a first one of the plurality of detectors is disposed inside the SEM column and a second one of the plurality of detectors is disposed outside the SEM column"; and "a first monitor for displaying an image produced by the first detector, and a second monitor for displaying

an image produced by the second detector" as claimed in claim 43, 44 and 45 respectively. Shahar in a scanning electronic microcopy teaches "a plurality of spaced-apart detectors and a monitor to display images produced by the plurality of detectors", (see figure 1, detectors 170, 240 and 250, and for the monitor see col. 1, line 27, wherein he teaches that the signal as received by the detector can be displayed i.e. there exist a monitor to display the signal); "SEM comprises an SEM column, wherein a first one of the plurality of detectors is disposed inside the SEM column and a second one of the plurality of detectors is disposed outside the SEM column", (see figure 1, numerical 10 for the column, numerical 170 for the detector inside the column and numerical 240 for the detector out side the column); and "a first monitor for displaying an image produced by the first detector, and a second monitor for displaying an image produced by the second detector", (see col. 1, line 27, wherein, it is obvious that a monitor is present to display the signals as the signals received by the detectors) a monitor as claimed in claim 43, 44 and 45 respectively.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Mizuno, Broude and Shimizu method and system for manufacturing semiconductor devices and method and system for inspecting semiconductor devices by introducing the detectors and the monitors as taught by the Shahar in scanning electron microscope for giving out a better perspective of the image. This modification will provide a SEM for an inspection system for an article that will have more then one detector to detect the reflected light and there by giving a better perspective of the article.

Claim 35 and 36 is rejected as claims 43 and 44 as claims 35 and 36 are claiming similar subject matter as claims 43 and 44.

6. Claims 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuno in view of Shahar et al.

With respect to claim 46, Mizuno in method and system for manufacturing semiconductor devices and method and system for inspecting semiconductor devices disclose 'classifying the defect as being in one of a predetermined number of classes of defects", (see figure 1, and figure 7, and col. 3, lines 38-45 and lines 57-59). However, Mizuno fails to disclose "imaging the surface with a scanning electron microscope and an optical image", as claimed in claim 46. Shahar in a scanning electronic microcopy teaches "imaging the surface with a scanning electron microscope and an optical image", (see figure 1, numerical 10 for the column, being the SEM and numerical 240 and 250 for the optical detectors and col. 5, lines 15-21 for description), as claimed in claim 46.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Mizuno's method and system for manufacturing semiconductor devices and method and system for inspecting semiconductor devices by introducing the detectors and the monitors as taught by the Shahar in scanning electron microscope for giving out a better perspective of the image. This modification will provide a SEM for an inspection system for an article that will have more then one detector to detect the reflected light and there by giving a better perspective of the article.

7. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuno in view of Shahar et al as applied to claim 46 above, and further in view of Takagi et al (US 5801965).

With respect to claim 47, Mizuno and Shahar discloses the invention substantially as disclose and as described above in claim 46. However, they fail to disclose "the classes of defects include the color of the surface" as claimed. Takagi in inspection system for semiconductor device teaches, "the classes of defects include the color of the surface", (see figure 10 feature data) as claimed.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Mizuno's and Shahar's method and system for manufacturing semiconductor devices and method and system for inspecting semiconductor devices by introducing the classification of the defects and the class be color of the substrate as taught by Takagi in his inspection method. This modification will provide an inspection and classification system for a semiconductor and classifying defects as color.

8. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuno in view of Shahar et al as applied to claim 46 above, and further in view of Tsuchiya et al (US 5960106).

With respect to claim 48, Mizuno and Shahar discloses the invention substantially as disclose and as described above in claim 46. However, they fail to disclose "wherein the surface is glass, and the classes of defects include a particle embedded in the surface and substantially not protruding from the surface" as claimed.

Tsuchiya in sample inspection method teaches "wherein the surface is glass, and the classes of defects include a particle embedded in the surface and substantially not protruding from the surface", (see col. 2, lines 22-25, wherein, the glass substrate is inspected for the chrome depositing) as claimed.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Takagi's and Shahar's method and system for manufacturing semiconductor devices and method and system for inspecting semiconductor devices by introducing the glass substrate inspection for the embedded particles as taught by Tsuchiya in his sample inspection method. This modification will provide an inspection system for a glass article for inspecting the embedded particles on the substrate.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vikkram Bali whose telephone number is 703.305.4510. The examiner can normally be reached on 7:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703.308.6604. The fax phone number for the organization where this application or proceeding is assigned is 703.872.9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.306.0377.

Vikkram Bali
Examiner
Art Unit 2623

Vb
December 9, 2003

AMELIA M. AU
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